FIG.1

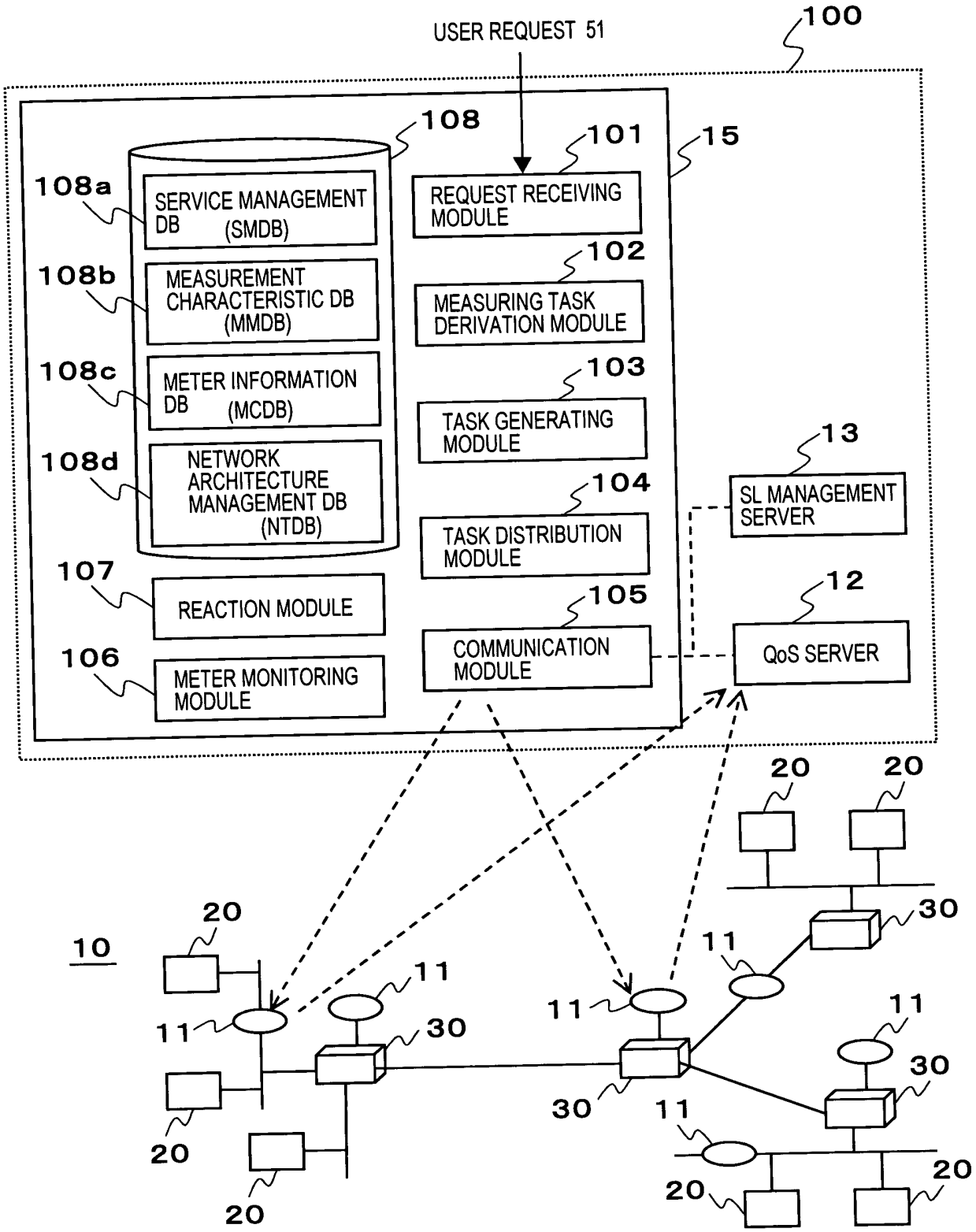

USER REQUEST 51
100
108
101
15
108a
SERVICE MANAGEMENT DB (SMDB)
REQUEST RECEIVING MODULE
102
108b
MEASUREMENT CHARACTERISTIC DB (MMDB)
MEASURING TASK DERIVATION MODULE
103
108c
METER INFORMATION DB (MCDB)
TASK GENERATING MODULE
13
108d
NETWORK ARCHITECTURE MANAGEMENT DB (NTDB)
104
SL MANAGEMENT SERVER
TASK DISTRIBUTION MODULE
107
REACTION MODULE
105
12
106
METER MONITORING MODULE
COMMUNICATION MODULE
QoS SERVER
20
10
11
30

FIG.2

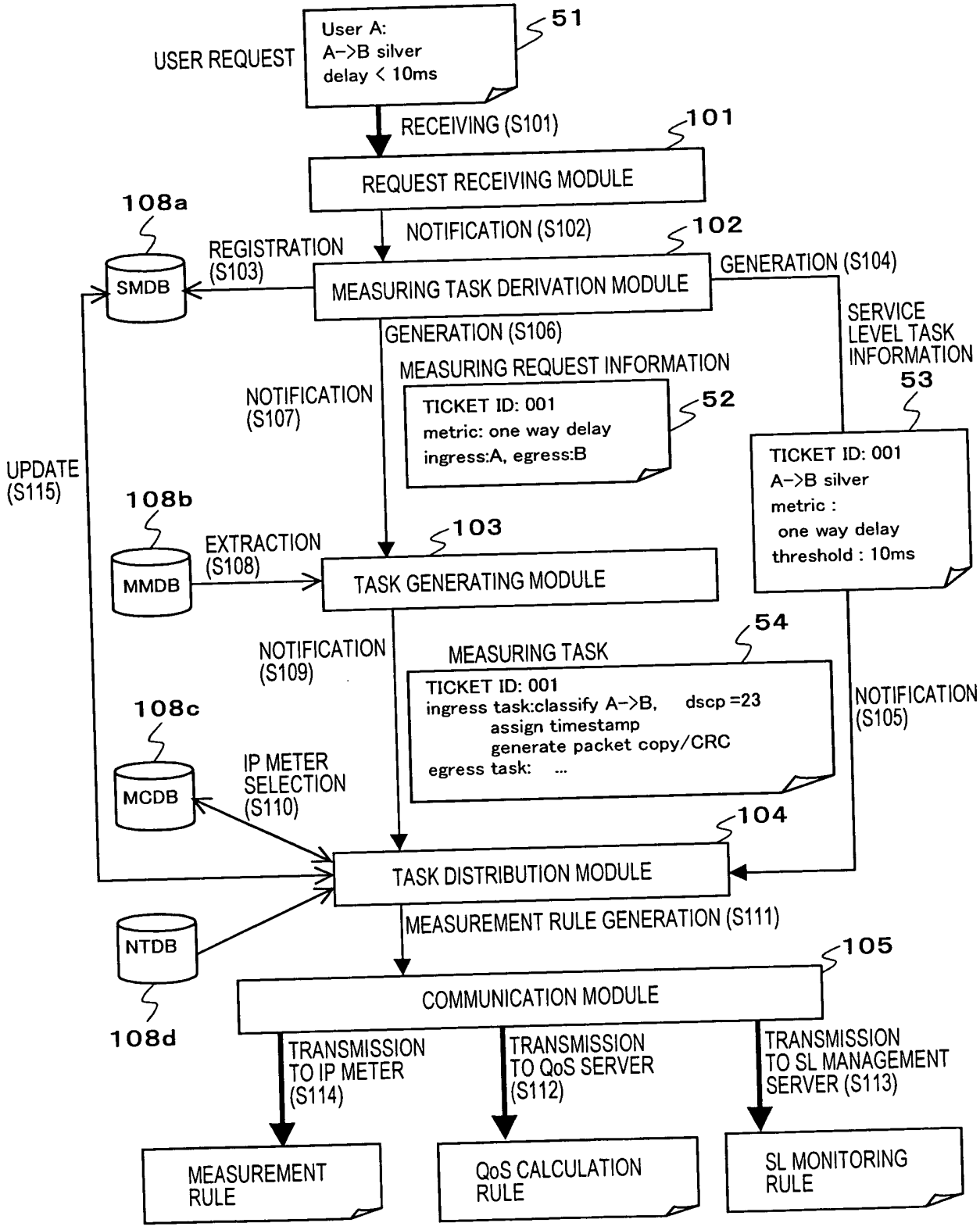

USER REQUEST
User A:
A->B silver
delay < 10ms
51
RECEIVING (S101)
101
REQUEST RECEIVING MODULE
108a
SMDB
REGISTRATION (S103)
NOTIFICATION (S102)
102
MEASURING TASK DERIVATION MODULE
GENERATION (S104)
SERVICE LEVEL TASK INFORMATION
53
GENERATION (S106)
MEASURING REQUEST INFORMATION
TICKET ID: 001
metric: one way delay
ingress:A, egress:B
52
NOTIFICATION (S107)
TICKET ID: 001
A->B silver
metric :
one way delay
threshold : 10ms
UPDATE (S115)
108b
MMDB
EXTRACTION (S108)
103
TASK GENERATING MODULE
NOTIFICATION (S109)
54
MEASURING TASK
TICKET ID: 001
ingress task:classify A->B, dscp =23
assign timestamp
generate packet copy/CRC
egress task: ...
NOTIFICATION (S105)
108c
MCDB
IP METER SELECTION (S110)
104
TASK DISTRIBUTION MODULE
NTDB
MEASUREMENT RULE GENERATION (S111)
105
COMMUNICATION MODULE
108d
TRANSMISSION TO IP METER (S114)
TRANSMISSION TO QoS SERVER (S112)
TRANSMISSION TO SL MANAGEMENT SERVER (S113)
MEASUREMENT RULE
QoS CALCULATION RULE
SL MONITORING RULE

FIG.3

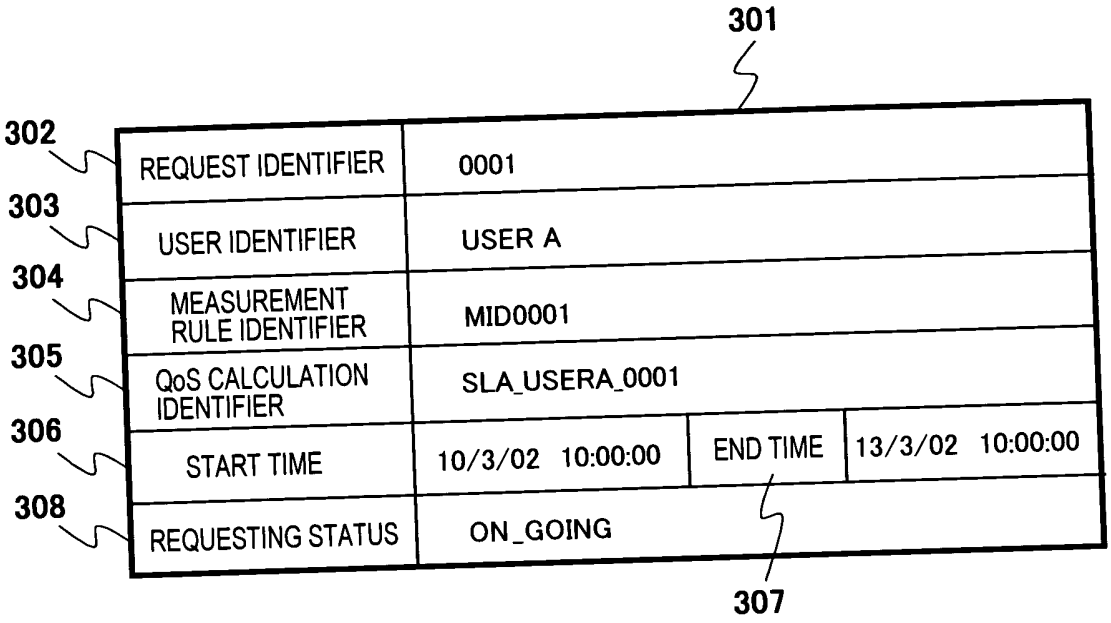

301
302
303
304
305
306
308
307
REQUEST IDENTIFIER
0001
USER IDENTIFIER
USER A
MEASUREMENT RULE IDENTIFIER
MID0001
QoS CALCULATION IDENTIFIER
SLA_USERA_0001
START TIME
10/3/02 10:00:00
END TIME
13/3/02 10:00:00
REQUESTING STATUS
ON_GOING

FIG.4

402 MEASUREMENT TYPE	403 NUMBER OF IP METERS TO BE USED	404 IP METER TASK	405 QoS SERVER TASK
	1	VOLUME_CALC_ON _METER	NONE
		PACKET_COPY, CRC_CONDENSE	VOLUME _CALCURATION
ONE WAY DELAY	2	PACKET_COPY, CRC_CONDENSE	DELAY_ CALCURATION
RTT	1-SENDER	VOLUME_CALC_ON _METER	NONE
		PACKET_COPY, CRC_CONDENSE	RTT_CALCURATION
. . .	. . .	. . .	. . .

401

FIG.5

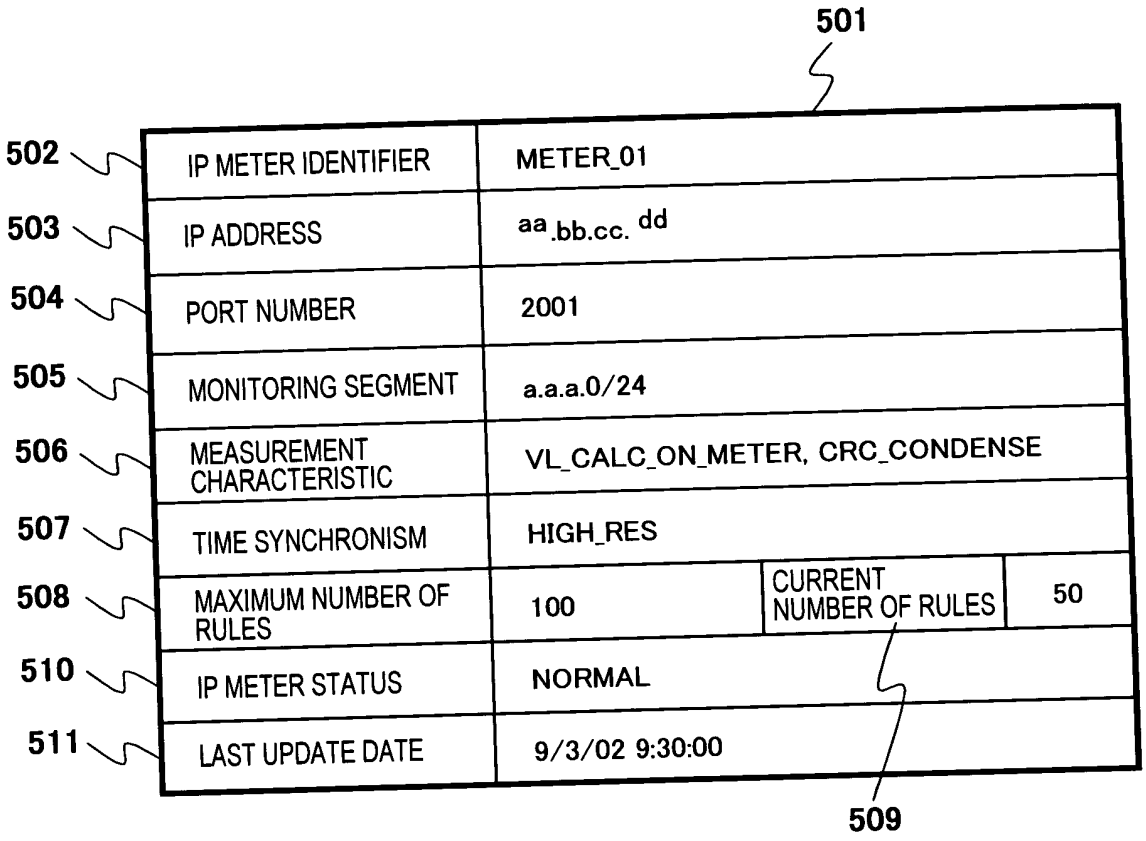

501
502
503
504
505
506
507
508
510
511
509
IP METER IDENTIFIER
METER_01
IP ADDRESS
aa.bb.cc.dd
PORT NUMBER
2001
MONITORING SEGMENT
a.a.a.0/24
MEASUREMENT CHARACTERISTIC
VL_CALC_ON_METER, CRC_CONDENSE
TIME SYNCHRONISM
HIGH_RES
MAXIMUM NUMBER OF RULES
100
CURRENT NUMBER OF RULES
50
IP METER STATUS
NORMAL
LAST UPDATE DATE
9/3/02 9:30:00

FIG.6

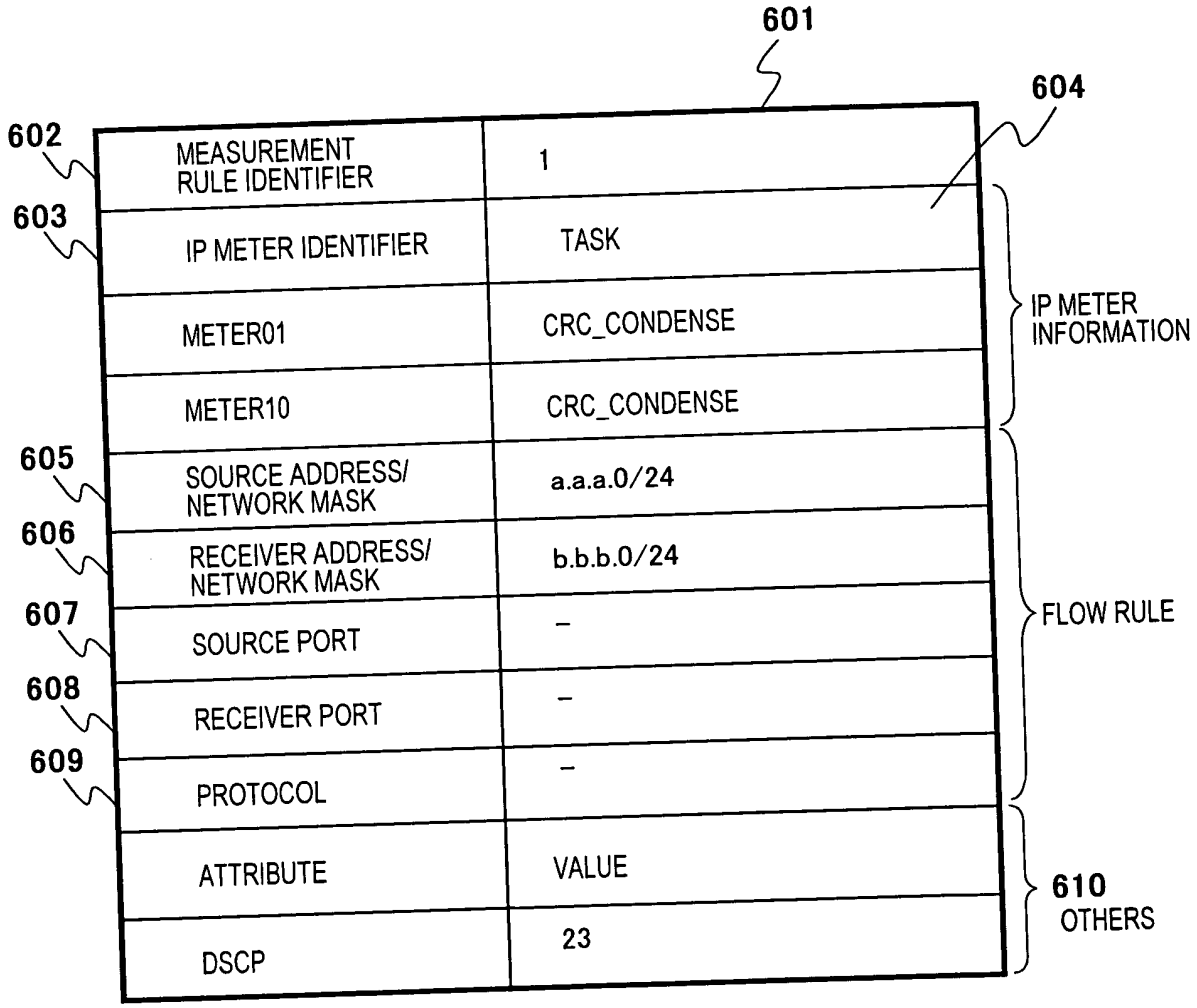

601
602
603
604
605
606
607
608
609
610
MEASUREMENT RULE IDENTIFIER
1
IP METER IDENTIFIER
TASK
METER01
CRC_CONDENSE
METER10
CRC_CONDENSE
SOURCE ADDRESS/ NETWORK MASK
a.a.a.0/24
RECEIVER ADDRESS/ NETWORK MASK
b.b.b.0/24
SOURCE PORT
–
RECEIVER PORT
–
PROTOCOL
–
ATTRIBUTE
VALUE
DSCP
23
IP METER INFORMATION
FLOW RULE
OTHERS

FIG.7

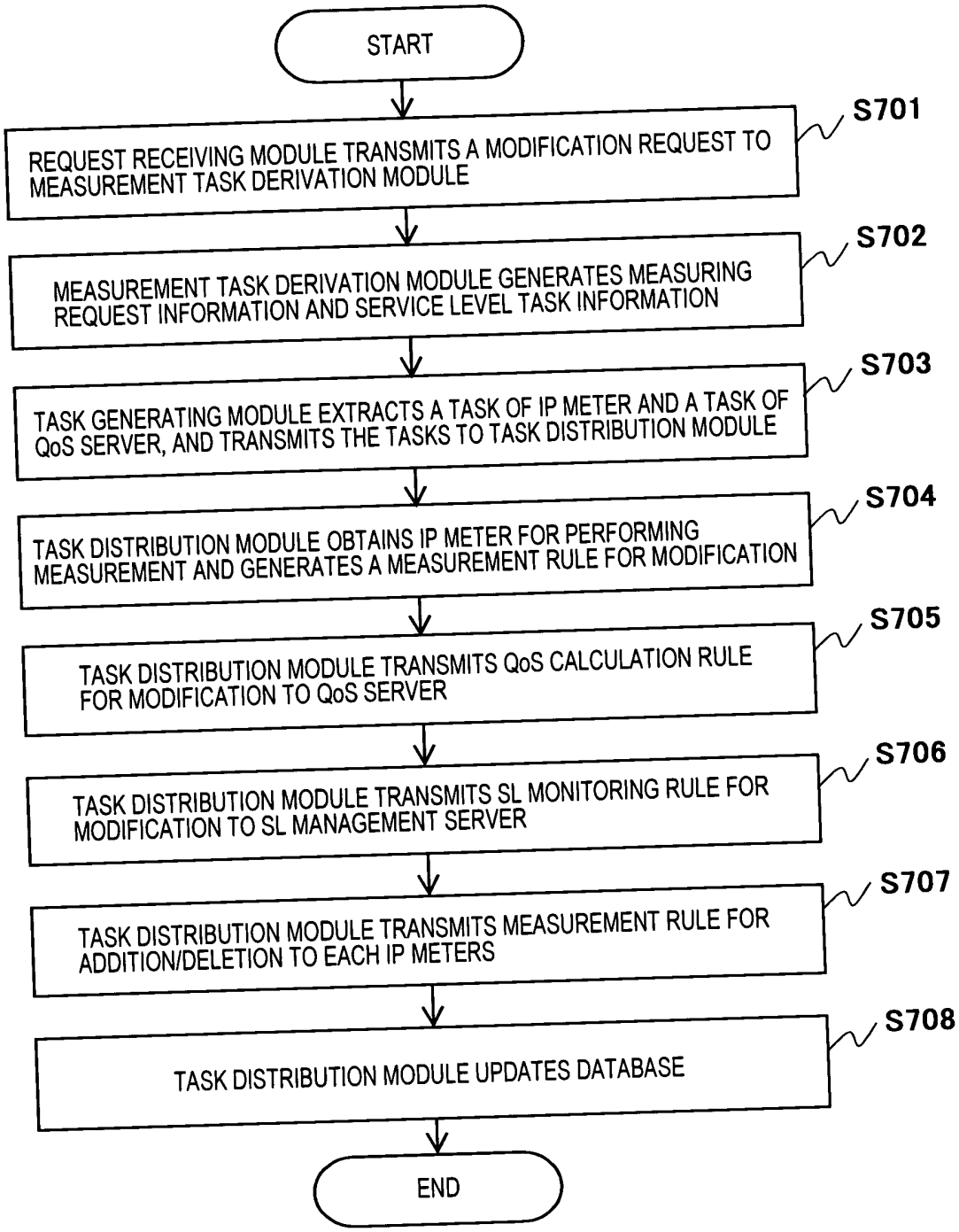

START
REQUEST RECEIVING MODULE TRANSMITS A MODIFICATION REQUEST TO MEASUREMENT TASK DERIVATION MODULE
S701
MEASUREMENT TASK DERIVATION MODULE GENERATES MEASURING REQUEST INFORMATION AND SERVICE LEVEL TASK INFORMATION
S702
TASK GENERATING MODULE EXTRACTS A TASK OF IP METER AND A TASK OF QoS SERVER, AND TRANSMITS THE TASKS TO TASK DISTRIBUTION MODULE
S703
TASK DISTRIBUTION MODULE OBTAINS IP METER FOR PERFORMING MEASUREMENT AND GENERATES A MEASUREMENT RULE FOR MODIFICATION
S704
TASK DISTRIBUTION MODULE TRANSMITS QoS CALCULATION RULE FOR MODIFICATION TO QoS SERVER
S705
TASK DISTRIBUTION MODULE TRANSMITS SL MONITORING RULE FOR MODIFICATION TO SL MANAGEMENT SERVER
S706
TASK DISTRIBUTION MODULE TRANSMITS MEASUREMENT RULE FOR ADDITION/DELETION TO EACH IP METERS
S707
TASK DISTRIBUTION MODULE UPDATES DATABASE
S708
END

FIG.8

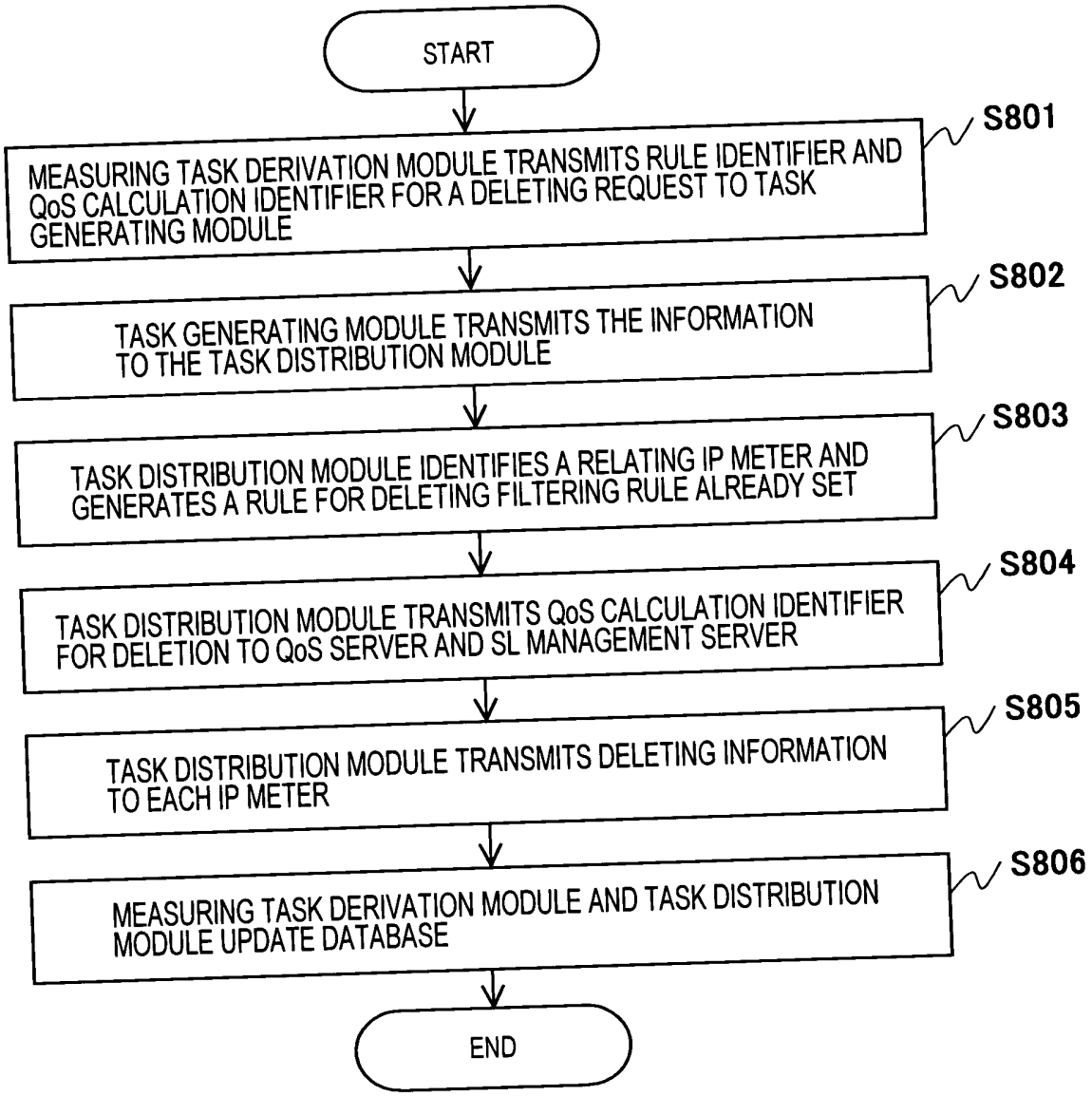

START
MEASURING TASK DERIVATION MODULE TRANSMITS RULE IDENTIFIER AND QoS CALCULATION IDENTIFIER FOR A DELETING REQUEST TO TASK GENERATING MODULE
S801
TASK GENERATING MODULE TRANSMITS THE INFORMATION TO THE TASK DISTRIBUTION MODULE
S802
TASK DISTRIBUTION MODULE IDENTIFIES A RELATING IP METER AND GENERATES A RULE FOR DELETING FILTERING RULE ALREADY SET
S803
TASK DISTRIBUTION MODULE TRANSMITS QoS CALCULATION IDENTIFIER FOR DELETION TO QoS SERVER AND SL MANAGEMENT SERVER
S804
TASK DISTRIBUTION MODULE TRANSMITS DELETING INFORMATION TO EACH IP METER
S805
MEASURING TASK DERIVATION MODULE AND TASK DISTRIBUTION MODULE UPDATE DATABASE
S806
END

FIG.9

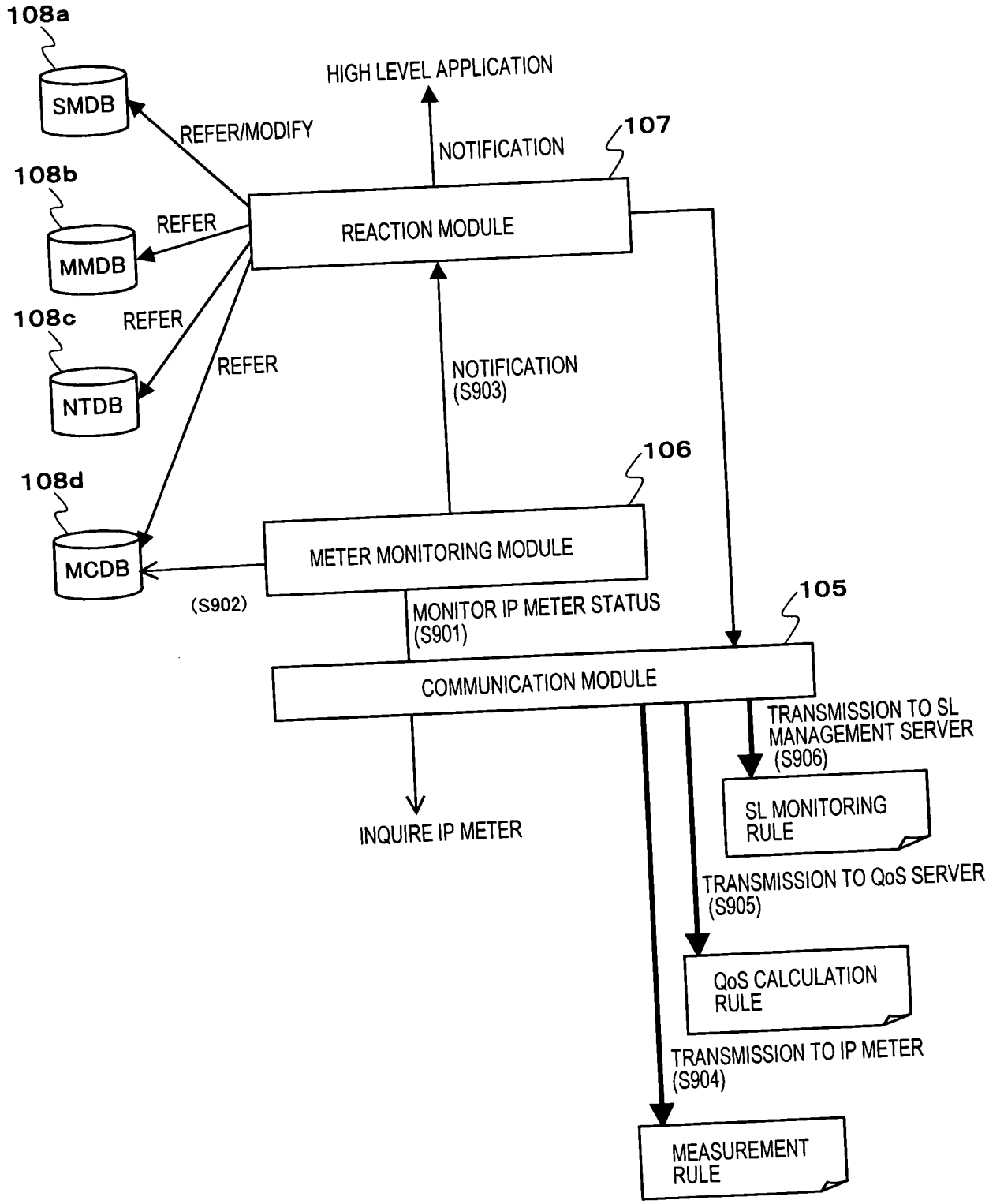
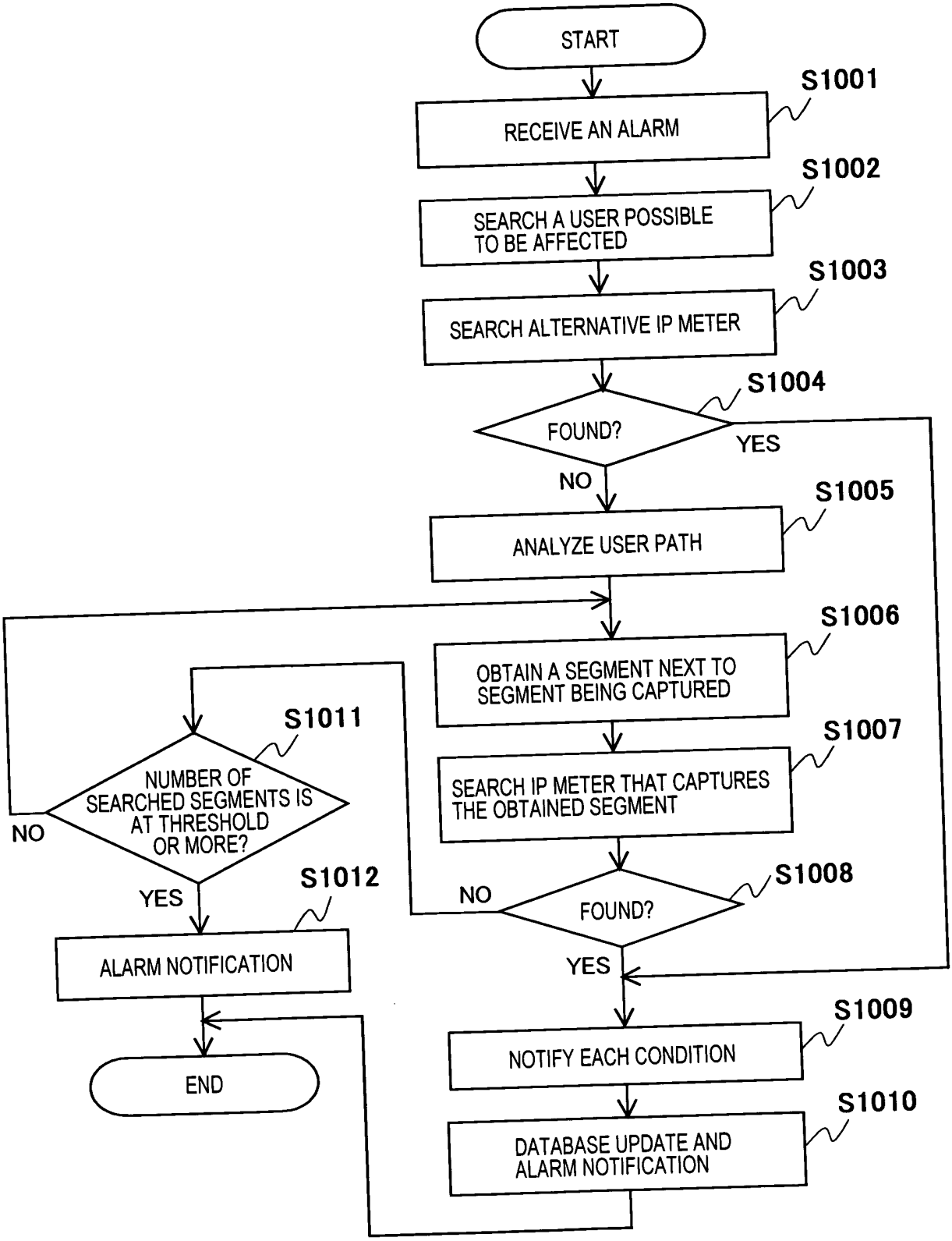

108a
SMDB
HIGH LEVEL APPLICATION
REFER/MODIFY
NOTIFICATION
107
108b
MMDB
REFER
REACTION MODULE
108c
REFER
NTDB
REFER
NOTIFICATION
(S903)
106
108d
MCDB
METER MONITORING MODULE
(S902)
MONITOR IP METER STATUS
(S901)
105
COMMUNICATION MODULE
TRANSMISSION TO SL
MANAGEMENT SERVER
(S906)
SL MONITORING
RULE
INQUIRE IP METER
TRANSMISSION TO QoS SERVER
(S905)
QoS CALCULATION
RULE
TRANSMISSION TO IP METER
(S904)
MEASUREMENT
RULE

FIG.10


START
S1001
RECEIVE AN ALARM
S1002
SEARCH A USER POSSIBLE TO BE AFFECTED
S1003
SEARCH ALTERNATIVE IP METER
S1004
FOUND?
YES
NO
S1005
ANALYZE USER PATH
S1006
OBTAIN A SEGMENT NEXT TO SEGMENT BEING CAPTURED
S1007
SEARCH IP METER THAT CAPTURES THE OBTAINED SEGMENT
S1008
FOUND?
NO
YES
S1009
NOTIFY EACH CONDITION
S1010
DATABASE UPDATE AND ALARM NOTIFICATION
S1011
NUMBER OF SEARCHED SEGMENTS IS AT THRESHOLD OR MORE?
NO
YES
S1012
ALARM NOTIFICATION
END